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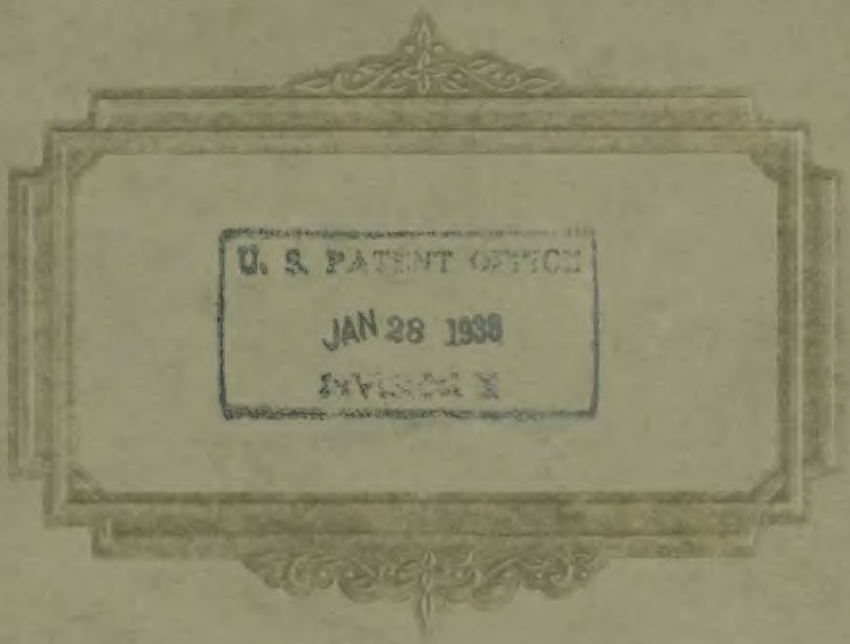

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CONTEST BOARD
OF THE
AMERICAN AUTOMOBILE ASSOCIATION

PENNSYLVANIA AVE. AT SEVENTEENTH ST.
WASHINGTON, D. C.

CERTIFICATE OF PERFORMANCE AND TECHNICAL REPORT
CERTIFIED TEST NO. 3238

U. S. PATENT OFFICE
JAN 28 1938
DIVISION X

INSULATED AUTO BODY TEMPERATURE TESTS

Purpose of Tests: Under this Sanction, two tests were conducted:

1. To determine the effect of an air-insulated dash upon the temperatures experienced in the front-seat compartment of an automobile under actual driving conditions as compared to a car not so equipped.

2. To demonstrate the results obtainable through use of "Ferro-Therm" (metallic) heat-insulation in an automobile body, as compared to the results obtained in an automobile not so equipped but otherwise identical.

Sanctionee: American Flange & Manufacturing Company, New York, New York.

TEST NO. 1 - AIR INSULATED DASH

Date of Test: July 16, 1935; 12:45 P.M. to 3:30 P.M.

Location: On Public Highway adjoining Merrimac, Massachusetts.

Equipment: Two Lincoln automobiles of 1935 model and 145-inch wheelbase were used. The car hereinafter identified as No. 1 was fitted with a standard Judkins Three-Window Berline body. The car hereinafter identified as No. 2 was fitted with a body identical to that of No. 1 except that into No. 2 had been built a baffle from the windshield belt rail to the floor boards and to the cowl trim. This construction provided a chamber into which air entered through the top ventilator of the cowl and from which air passed through the other ventilators installed in the sides of the cowl, being prevented by the baffle from entering the body proper.

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Equipment: (Cont.)

Three calibrated mercury thermometers were used to record temperatures developed in each car. In Car No. 1, one thermometer was installed on the dash board to record the air temperatures about an occupant's feet with legs extended; in Car No. 2, one thermometer was installed on the baffle to record the air temperatures at the same position.

In each car a second thermometer was placed on the front of the seat cushion to record temperatures at the position of an occupant's ankle with feet against the seat. A third thermometer was fastened high on the rear cushion of the front seat of each car to record temperatures at the position of an occupant's back.

Procedure:

The cars were run on the open highway, approximately 200 feet apart and at an average speed of 40 miles per hour. Two runs were conducted and two sets of temperature readings were recorded under this test:

1. With all windows closed in both cars and with the cowl apertures open to ventilate the baffle enclosed dash-compartment of Car No. 2, no outside air being permitted to enter the body of either car.

2. With the cowl aperture open in Car No. 1 and the baffle ventilator open in Car No. 2 and with the windows of the front doors of both cars open.

Temperature readings of each of the three thermometers in each car were recorded every 15 minutes. During run No.1, the first reading was taken at 12:45 p.m., and the final reading at 2:30 p.m. During run No. 2, the first reading was taken at 2:45 p.m., and the final reading at 3:30 p.m.

Results:

Observations based on the results obtained from the test procedure as outlined showed:

1. That Car No. 2 equipped with the air-insulated dash maintained interior temperatures constantly cooler than readings on thermometers in Car No. 1, as shown in the table under Appendix "A".

2. That only through the direct influences of outside temperatures when all windows of both cars were opened did Car No. 1 (without the air-insulated dash) maintain temperatures within the range of thermometer readings in Car No. 2, as shown in the table under Appendix "B".

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TEST NO.2 - "FERRO-THERM" BODY INSULATION

Date of Test: July 17, 1935; 10:40 A.M. to 2:40 P.M.

Location: Merrimac, Massachusetts, on an open site reasonably sheltered from wind. Care was taken to avoid reflected heat from the ground or buildings.

Equipment: Two Lincoln automobiles of 1935 model and 145-inch wheelbase were used. The car hereinafter identified as No. 1 was fitted with a Standard Judkins Three-Window Berline body. The car hereinafter identified as No. 2 was fitted with a body identical to that of No. 1, except that in No. 2 "Ferro-Therm" insulation had been built into the roof between the top material and the head lining, and had been installed underneath the floor.

Four calibrated mercury thermometers were used in this test. One thermometer recorded the Sun temperatures, one thermometer recorded the Shade temperatures, and one thermometer to record the interior temperatures was hung in each car about head height in the center of the body.

Procedure: The cars were spaced approximately 20 feet apart facing North.

After opening all windows, ventilators and hoods, both cars were allowed to stand in this position one hour and thirty minutes before temperature readings were started. By this procedure engine and body interior were reduced to approximate atmospheric temperature.

All windows, doors, ventilators and hoods were then closed and temperature readings of the thermometers in the cars were taken every 10 minutes and compared with readings of the Sun and Shade temperatures taken at those intervals.

Results: Observations based on the results obtained during the test procedure as outlined showed:

1. That Car No. 2, equipped with "Ferro-Therm" insulation, maintained interior temperatures impressively cooler than the temperatures recorded in Car No. 1, as shown in the table under Appendix "C".

2. That Car No. 2, equipped with "Ferro-Therm" insulation, maintained a more even table of temperatures during the 25 readings than Car No. 1.

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General Conclusion: The results recorded under Test Nos. 1 and 2, clearly indicate the value of the types of insulation utilized in each instance, i.e., the air-insulated dash chamber in Test No. 1 and the "Ferro-Therm" body insulation in Test No. 2, both with respect to reduced temperatures and the limit placed on wide variations.

Appendices: Attached hereto and completing this report are:

Appendix "A" - Table of comparative temperatures recorded in Test No. 1 with car windows closed.

Appendix "B" - Table of comparative temperatures recorded in Test No. 1 with car windows open.

Appendix "C" - Table of comparative temperatures recorded in Test No. 2.

Rules of the Contest Board covering Official Certified Tests provide that statements based upon this report must be confined to the facts contained herein and must not be extended to any statement of what might occur under other given circumstances.

Contest Board of the American Automobile Association

By _____

Secretary

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APPENDIX "A"

(AIR-INSULATED DASH TEST)
TABLE OF COMPARATIVE TEMPERATURES
ALL WINDOWS AND VENTILATORS CLOSED

Air Temperature	Time (All P.M.)	Car No. 1 Thermometers #1	#2	#3	Car No. 2 Thermometers #1	#2	#3
80	12:45	85°	82°	86°	84°	83°	84°
80	1:00	86°	83°	90°	84°	84°	86°
80	1:15	88°	83°	91°	89°	84°	88°
80	1:30	89°	86°	91°	88°	88°	89°
80	1:45	92°	89°	97°	88°	88°	89°
80	2:00	93°	91°	99°	88°	88°	89°
80	2:15	94°	92°	101°	89°	89°	90°
80	2:30	94°	92°	101°	89°	89°	90°

Weather: No Sun; Cool; Occasional Showers.

APPENDIX "B"

(AIR-INSULATED DASH TEST)
TABLE OF COMPARATIVE TEMPERATURES
WINDOWS IN FRONT DOORS AND VENTILATORS OPEN IN BOTH CARS

Air Temperature	Time (All P.M.)	Car No. 1 Thermometers #1	#2	#3	Car No. 2 Thermometers #1	#2	#3
80	2:45	86°	84°	90°	84°	84°	86°
80	3:00	86°	83°	86°	84°	85°	86°
80	3:15	86°	84°	86°	86°	86°	86°
80	3:30	86°	84°	86°	86°	86°	86°

Weather: No Sun; Cool; Occasional Showers.

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APPENDIX "C"

("FERRO-THERM" BODY INSULATION TEST)
TABLE OF COMPARATIVE TEMPERATURES

Time	Sun Thermometer	Shade Thermometer	Car No.1	Car No.2	Remarks
10:40	85°	85°	86°	86°	
10:50	85°	85°	95°	91°	No wind
11:00	85°	84½°	104°	96°	
11:10	85°	84½°	107°	100°	
11:20	86°	85°	109½°	102°	
11:30	85½°	85°	111°	103°	
11:40	86°	86°	112½°	104½°	
11:50	86½°	85½°	114°	105½°	Small cloud
12:00	86°	86°	115°	107°	Large cloud
12:10	83°	82°	113°	106½°	Wind 10 MPH
12:20	83°	83°	111°	105½°	Cloud & wind
12:30	82°	82°	109°	105°	Cloud & wind
12:40	84°	83°	109°	105°	Cloud & wind
12:50	86°	85°	110°	105½°	Slight breeze
1:00	84°	83°	111°	106°	Cloud
1:10	85°	85°	113°	106°	
1:20	86°	86°	113½°	107°	
1:30	86°	85°	113½°	107°	
1:40	88°	86°	114°	108°	
1:50	87°	86°	115°	109°	
2:00	85°	85°	115½°	109°	Cloud & breeze
2:10	89°	87°	115½°	109½°	
2:20	88°	86°	115½°	110°	
2:30	83°	84°	115½°	110°	
2:40	82°	82°	112°	108°	Heavy clouds

NOTE:

At conclusion of this test, thermometers Nos. 1 & 3 from Test No. 1 were read and the following temperatures were recorded:

Thermometer	Car No.1	Car No.2
#1	96½°	86°
#3	108°	103°

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